



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/632,652

08/02/2003

Arne W. Ballantine

END9-2000-0086-US2

3570

30449

7590

03/16/2005

SCHMEISER, OLSEN + WATTS
3 LEAR JET LANE
SUITE 201
LATHAM, NY 12110

EXAMINER

TSAI, H JEY

ART UNIT

PAPER NUMBER

2812

DATE MAILED: 03/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/632,652

Applicant(s)

BALLANTINE ET AL.

Examiner

H.Jey Tsai

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 15-44 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 15-44 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 11/18/4.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 15-17, 19, 21-24, 26-28, 30-38, 40-44 stand rejected under 35 U.S.C. § 102(e) as being anticipated by LaFollette et al. 6,610,440, previously applied.

LaFollette et al. discloses a method for forming an electrochemical structure within an integrated circuit comprising the step; of:

providing a semiconductor wafer, col. 18, lines 30+,

forming a layer 30 of electronic devices (inherently a part of integrated circuit, IC, col. 12, lines 41-65) on the semiconductor wafer, wherein the layer of electronic devices includes at least one electronic device, fig. 3+ and col. 20, lines 15+,

forming N wiring levels within an interconnect structure of the integrated circuit- wherein the N wiring levels are disposed on the layer of electronic devices, wherein N is at least 1, wherein the N wiring levels are denoted as wiring level 1 (30, SiO₂), wiring level 2 (38),, fig. 3+,,

forming a first conductive metalization 46 and a second conductive metalization 47 (or 49) within the N wiring levels,

forming at least one battery 44' within the wiring levels (1 and 2, first and second level or ribbon connection in fig. 3 can be replaced with thin film interconnect, see col. 25, lines 20+, that is I=1 through K....., wherein I is selected from the group consisting

Art Unit: 2812

of 1, 2,N, wherein K is selected from the group consisting of I, I+1,.... and N), wherein the first conductive metalization 46 conductively couples a first electrode 34" of the at least one battery 44' to the at least one electronic device 59, 59', wherein the second conductive 47 representation conductively couples a second electrode 40" of the battery to the at least one electronic device, and wherein the first and second conductive metalization are totally external to the interior of the at least one battery, fig. 4+, col. 25, lines 55+,

forming a trench (cavity) 42' within ILD layer 38", col. 23, lines 1+,

depositing electrolyte layer,

forming first and second battery electrode (anode and cathode) with Zn, col. 13, lines 38+.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections lithium phosphorous oxynitride set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 18, 20, 25, 29, 39 stand rejected under 35 U.S.C. 103(a) as being unpatentable over LaFollette et al. 6,610,440 as applied to claims 15-17,19, 21-24, 26-28, 30-38, 40-43 above, and further in view of Bates et al. 5,561,004 and Wolk et al. 2001/0000744, previously applied.

Art Unit: 2812

LaFollete et al. teaches forming an electrochemical structure of battery within an integrated circuit but does not teach using lithium phosphorous oxynitride as an electrolyte. However, Bates et al. teaches at col. 2, lines 15-25, using lithium phosphorous oxynitride as an electrolyte 26 for a battery and Wolk et al. teaches at para. 35 and 90, using a diffusion battery layer for a battery.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified above reference by using lithium phosphorous oxynitride and forming a diffusion barrier layer as suggested by Bates and Wolk et al. because lithium phosphorous oxynitride can be formed as a layer structure on the cathode that is compatible with the semiconductor process and forming a diffusion layer to prevent corrosion formed on the cathode electrode.

Applicant's arguments filed Dec. 27, 2004 have been fully considered but they are not persuasive. Because LaFollette clearly teaches at col. 12, lines 58-65, forming integrate circuit (IC, electronic device), MEMS and batteries on the same device. And, silicon dioxide is inherently a part of IC. Such basic knowledge of Integrated circuit processing technology can be found in any semiconductor text book, such as Wolf. Since, electronic device (IC) and battery are formed in the same substrate (wafer), hence, inherently conductive layer must connect the battery electrodes to the electrode device for the entire device to work.

LaFollette teaches at col. 12, lines 58-65 as follow:

In order for a microscopic battery to be optimal for internal inclusion in an integrated circuit, such as a MEMS, the batteries must be integrated with the circuit (either on a retrofit or original manufacture basis). The processes used to make microscopic batteries are intended for the most part to be compatible with those used to make components in the circuit, particularly

Art Unit: 2812

the circuit (either on a retrofit or original manufacture basis). The processes used to make microscopic batteries are intended for the most part to be compatible with those used to make components in the circuit, particularly where integration is obtained at the time of manufacture.

And, at col. 13, lines 11-23:

The batteries of the invention are presently most often formed upon a suitable substrate, either rigid or flexible (conformal). Commonly a silicon wafer is used as the base or substrate. Other suitable materials may be used, as will be apparent to those of skill in the art.

The substrate may be used not only as a base or carrier upon which a microscopic battery is formed but a base upon which other elements of the microcircuit are formed. Thus, a microcircuit with an internal integrated microscopic battery may be formed simultaneously or substantially simultaneously on a common base. Typically, the substrate is first be treated before formation of the microscopic battery to create an insulating or isolation layer. Parts of selected layers are removed to form a desired battery profile.

And, at col. 14, lines 45-60:

Fabrication of the Connectors

The microscopic batteries of the invention can be separately made and thereafter connected to other circuit components, for example on a retrofit basis, through use of suitable connectors. Microscopic wire bond, flip chip or TAB (tape automated bonding) connections are preferred, although and suitable technique available to those skilled in the art may be used.

The microscopic batteries of the invention may also be integrated (built unitarily and simultaneously) with an IC or MEMS, for example, to provide an autonomous system. Interconnection between the battery and the other components of the integrated circuit may be made by common thin film deposition, overlapping thin film deposition, wire bond, flip chip, TAB and/or in any other suitable way.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Art Unit: 2812

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry of a general nature or clerical matters or relating to the status of this application or proceeding should be directed to the Group customer service whose telephone number is (703) 308-4357.

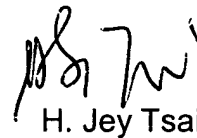
Any inquiry concerning this communication or earlier communications from the examiner should be directed to H. Jey Tsai whose telephone number is (571) 272-1684. The examiner can normally be reached on from 7:00 Am to 4:00 Pm., Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebenttric can be reached on (571) 272-1873.

The fax phone number for this Group is (703) 872-9306.

hjt

2/13/2005



H. Jey Tsai
Primary Examiner
Patent Examining Group 2800